WE CLAIM:

1. A disk drive comprising:

(a) a disk;

(b) a head;

(c) a voice coil motor (VCM) for actuating the head radially over the disk, the VCM comprising a voice coil;

(d) a plurality of driver switches for controlling a voltage applied to the voice coil;

(e) a pulse width modulated (PWM) signal generator for generating PWM control signals applied to the driver switches, the PWM signal generator comprises:

a control law block for generating an acceleration command in response to a commanded current and at least one estimated state of the VCM;

a command to timing block for generating a plurality of PWM timing signals in response to the acceleration command;

a PWM controller for generating the PWM control signals applied to the driver switches in response to the PWM timing signals, wherein the command to timing block, PWM controller, driver switches, and voice coil comprise a plant transfer function;

a current detector for detecting a current flowing through the voice coil;

a plant model comprising a model transfer function for generating the estimated state of the VCM in response to the detected current flowing through the voice coil; and

a correction block, responsive to the detected current, for adjusting the PWM timing signals so that the plant transfer function substantially matches the model transfer function.

2. The disk drive as recited in claim 1, wherein the at least one estimated state of the VCM comprises at least one of a position, velocity, and acceleration of the VCM.

3. The disk drive as recited in claim 1, wherein:

(a) the PWM timing signals comprise:

a PWM cycle time;

a Tforward time interval of the PWM cycle time wherein a positive control voltage is applied to the voice coil;

a Treverse time interval of the PWM cycle time wherein a negative control voltage is applied to the voice coil; and

a Tdead time interval of the PWM cycle time wherein a substantially zero control voltage is applied to the voice coil; and

(b) the correction block adjusts the Tdead time interval to control a magnitude of a ripple current flowing through the voice coil.

4. The disk drive as recited in claim 1, wherein:

(a) the voice coil comprises a resistance R and an effective inductance L;

(b) the effective inductance L is a function of the actual ripple current flowing through the voice coil;

(c) the resistance R changes with temperature drift; and

(d) the correction block adjusts the Tdead time interval to maintain a substantially constant L/R ratio.

5. The disk drive as recited in claim 1, wherein:

(a) the driver switches connect a supply voltage to the voice coil; and

(b) the correction block adjusts the PWM timing signals in response to the supply voltage.

6. The disk drive as recited in claim 5, wherein the correction block adjusts the Tforward and Treverse time intervals in response to the supply voltage.

7. The disk drive as recited in claim 1, wherein:

(a) the voice coil comprises a resistance R;

(b) the resistance R changes with temperature drift; and

(c) the correction block adjusts the Tforward and Treverse time intervals in response to a magnitude of the resistance R.

8. The disk drive as recited in claim 7, wherein the correction block adjusts a saturation limit of the Tforward and Treverse time intervals in response to a magnitude of the resistance R.

9. The disk drive as recited in claim 7, wherein:

(a) the VCM comprises a torque constant Kt; and

(b) the correction block adjusts a saturation limit of the Tforward and Treverse time intervals in response to a magnitude of the resistance R and to a magnitude of the torque constant Kt.

10. A method of operating a disk drive, the disk drive comprising a disk, a head, a voice coil motor (VCM) for actuating the head radially over the disk, the VCM comprising a voice coil, and a plurality of driver switches for controlling a voltage applied to the voice coil, the method comprising the steps of:

(a) generating an acceleration command in response to a commanded current and at least one estimated state of the VCM;

(b) generating a plurality of PWM timing signals in response to the acceleration command;

(c) generating PWM control signals applied to the driver switches in response to the PWM timing signals;

(d) detecting a current flowing through the voice coil;

(e) generating the estimated state of the VCM in response to the detected current flowing through the voice coil; and

(f) adjusting the PWM timing signals in response to the detected current so that a plant transfer function of the VCM and driver switches substantially matches a model transfer function.

11. The method as recited in claim 10, wherein the at least one estimated state of the VCM comprises at least one of a position, velocity, and acceleration of the VCM.

12. The method as recited in claim 10, wherein:

(a) the PWM timing signals comprise:

a PWM cycle time;

a Tforward time interval of the PWM cycle time wherein a positive control voltage is applied to the voice coil;

a Treverse time interval of the PWM cycle time wherein a negative control voltage is applied to the voice coil; and

a Tdead time interval of the PWM cycle time wherein a substantially zero control voltage is applied to the voice coil; and

(b) further comprising the step of adjusting the Tdead time interval to control a magnitude of a ripple current flowing through the voice coil.

13. The method as recited in claim 10, wherein:

(a) the voice coil comprises a resistance R and an effective inductance L;

(b) the effective inductance L is a function of the actual ripple current flowing through the voice coil;

(c) the resistance R changes with temperature drift; and

(d) further comprising the step of adjusting the Tdead time interval to maintain a substantially constant L/R ratio.

14. The method as recited in claim 10, wherein:

(a) the driver switches connect a supply voltage to the voice coil; and

(b) further comprising the step of adjusting the PWM timing signals in response to the supply voltage.

15. The method as recited in claim 14, further comprising the step of adjusting the Tforward and Treverse time intervals in response to the supply voltage.

16. The method as recited in claim 10, wherein:

(a) the voice coil comprises a resistance R;

(b) the resistance R changes with temperature drift; and

(c) further comprising the step of adjusting the Tforward and Treverse time intervals in response to a magnitude of the resistance R.

17. The method as recited in claim 16, further comprising the step of adjusting a saturation limit of the Tforward and Treverse time intervals in response to a magnitude of the resistance R.

18. The method as recited in claim 16, wherein:

(a) the VCM comprises a torque constant Kt; and

(b) further comprising the step of adjusting a saturation limit of the Tforward and Treverse time intervals in response to a magnitude of the resistance R and to a magnitude of the torque constant Kt.